PATENT
Docket No.: 53375/1461

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Yuji MIYAUCHI et al.

SERIAL NO. : Unassigned

FILED : January 18, 2002

FOR : IMAGE PICKUP SYSTEM

ASSISTANT COMMISSIONER
FOR PATENTS
Washington, D.C. 20231

PRELIMINARY AMENDMENT

SIR:

Prior to examination of the above-identified application, please enter the following amendments.

IN THE CLAIMS:

Amend the following claims:

3. (Amended) An image pickup system according to claim 1, wherein an image pickup plane of said electronic image pickup device has a diagonal length D capable of meeting the following condition (5):

$$5 \text{ mm} < D < 30 \text{ mm} \qquad \ldots(5)$$

4. (Amended) An image pickup system according to claim 1, wherein said image-formation optical system has an image-formation capability that satisfies the following condition (6), and said electronic image pickup device satisfies the following condition (7):

$$1.05 < \varphi_w / P \times \sqrt{(3.5/N)} < 8 / 0 \qquad \ldots(6)$$

$$0.0015 < P < 0.008 \text{ (mm)} \qquad \ldots(7)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or alternatively, a diameter of the 90% encircled energy at an wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

5. (Amended) An image pickup system according to claim 1, wherein said image-formation optical system is a zoom lens including a wide-angle end, in which a half angle of view with respect to a subject on an infinite object point is 36° or greater.

6. (Amended) An image pickup system according to claim 1, wherein said image-formation optical system is of image-formation capability satisfying the following condition (8):

$$1.5<\varphi_w/P,8.0 \qquad ...(8)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or, alternatively, a diameter of the 90% encircled energy at a wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

Add the following new claims:

7. An image pickup system according to claim 2, wherein an image pickup plane of said electronic image pickup device has a diagonal length D capable of meeting the following condition (5):

$$5 \text{ mm}<D<30 \text{ mm} \qquad ...(5)$$

8. An image pickup system according to claim 2, wherein said image-formation optical system has an image-formation capability that satisfies the following condition (6), and said electronic image pickup device satisfies the following condition (7):

$$1.05<\varphi_w/P \times \sqrt{(3.5/N)} <8 / 0 \quad ...(6)$$

$$0.0015<P<0.008 \text{ (mm)} \quad ...(7)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or alternatively, a diameter of the 90% encircled energy at an wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

9. An image pickup system according to claim 2, wherein said image-formation optical system is a zoom lens including a wide-angle end, in which a half angle of view with respect to a subject on an infinite object point is 36° or greater.

10. An image pickup system according to claim 2, wherein said image-formation optical system is of image-formation capability satisfying the following condition (8):

$$1.5<\varphi_w/P,8.0 \quad ...(8)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or, alternatively, a diameter of the 90% encircled energy at a wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

REMARKS

Claims 3-6 have been amended and new claims 7-10 added to eliminate the multiple dependencies. Examination of this application in light of these amendments is respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned **"Version With Markings To Show Changes Made."**

The Applicants submit these preliminary amendments for consideration before a first Office Action and request favorable action with respect to this application.

The Office is authorized to charge any underpayment or credit any overpayment to Kenyon & Kenyon Deposit Account No. 11-0600.

Respectfully submitted,

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Date: January 18, 2002

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"Version With Markings To Show Changes Made."

IN THE CLAIMS:

Amend the following claims:

3. (Amended) An image pickup system according to claim 1 [or 2], wherein an image pickup plane of said electronic image pickup device has a diagonal length D capable of meeting the following condition (5):

$$5 \text{ mm} < D < 30 \text{ mm} \qquad \ldots(5)$$

4. (Amended) An image pickup system according to claim 1 [or 2], wherein said image-formation optical system has an image-formation capability that satisfies the following condition (6), and said electronic image pickup device satisfies the following condition (7):

$$1.05 < \varphi_w / P \times \sqrt{(3.5/N)} < 8 / 0 \qquad \ldots(6)$$

$$0.0015 < P < 0.008 \text{ (mm)} \qquad \ldots(7)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or alternatively, a diameter of the 90% encircled energy at an wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

5. (Amended) An image pickup system according to claim 1 [or 2], wherein said image-formation optical system is a zoom lens including a wide-angle end, in which a half angle of view with respect to a subject on an infinite object point is 36° or greater.

6. (Amended) An image pickup system according to claim 1 [or 2], wherein said image-formation optical system is of image-formation capability satisfying the following condition (8):

$$1.5 < \varphi_w / P, 8.0 \qquad \ldots(8)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or, alternatively, a diameter of the 90% encircled energy at a wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

Add the following new claims:

7. An image pickup system according to claim 2, wherein an image pickup plane of said electronic image pickup device has a diagonal length D capable of meeting the following condition (5):

$$5 \text{ mm} < D < 30 \text{ mm} \qquad \ldots(5)$$

8. An image pickup system according to claim 2, wherein said image-formation optical system has an image-formation capability that satisfies the following condition (6), and said electronic image pickup device satisfies the following condition (7):

$$1.05 < \varphi_w / P \times \sqrt{(3.5/N)} < 8 / 0 \qquad \ldots(6)$$

$$0.0015 < P < 0.008 \text{ (mm)} \qquad \ldots(7)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or alternatively, a diameter of the 90% encircled energy at an wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.

9. An image pickup system according to claim 2, wherein said image-formation optical system is a zoom lens including a wide-angle end, in which a half angle of view with respect to a subject on an infinite object point is 36° or greater.

10. An image pickup system according to claim 2, wherein said image-formation optical system is of image-formation capability satisfying the following condition (8):

$$1.5<\varphi_w/P,8.0 \quad \ldots(8)$$

where φ_w is a diameter in mm of a 90% encircled energy of a point spread function by amplitude by an optical system at an f number of F5.6 at substantially the center of an image plane and a wavelength e-line, from which a low-pass action due to an optical low-pass filter is eliminated or, alternatively, a diameter of the 90% encircled energy at a wide-angle end in the case where said image-formation optical system is a zoom optical system, and P is a pixel pitch in mm of the image pickup device.